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PATENT, TRADEMARK, AND COPYRIGHT LAW  
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1 What is claimed is:  
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1       1. An apparatus for incremental data storage, the apparatus comprising:  
2              a baseline partition containing a baseline image;  
3              an incremental log configured to store data, the incremental log comprising at  
4              least one snapshot partition; and  
5              a partition module configured to automatically partition the incremental log into  
6              an additional snapshot partition in response to a snapshot operation.

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8       2. The apparatus of claim 1, wherein the partition module is further configured to  
9              assign a volume identifier to a newly formed partition as directed by a storage  
10             management policy.

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12      3. The apparatus of claim 1, further comprising a storage management module  
13              configured to support storage management policies selected from the group consisting of  
14              temporal-based policies, status-based policies, and event-based policies.

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16      4. The apparatus of claim 1, further comprising a compaction module configured to  
17              compact a snapshot partition.

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19      5. The apparatus of claim 4, wherein the compaction module is further configured to  
20              conduct compaction as directed by a storage management policy.

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22      6. The apparatus of claim 5, wherein the storage management policy is selected from  
23              the group consisting of a temporal-based policy, a status-based policy, and an event-based  
24              policy.

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26      7. The apparatus of claim 4, wherein the compaction module is further configured to  
27              conduct in-place compaction.

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- 3     8. The apparatus of claim 4, wherein the compaction module is further configured to
- 4         automatically compact a snapshot partition to the baseline volume.
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- 6     9. The apparatus of claim 1, further comprising a copy module configured to copy
- 7         selected log entries to the tertiary volume.
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- 9     10. The apparatus of claim 1, further comprising a read module configured to retrieve
- 10         the most recent data corresponding to a block address.
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- 12     11. The apparatus of claim 1, wherein the read module is further configured to retrieve
- 13         the most recent data corresponding to a specified snapshot volume and block address.
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- 15     12. An interface for managing incremental data storage, the interface comprising:
  - 16             a write function configured to append an entry to an incremental log;
  - 17             a read function configured to retrieve a most recent log entry corresponding to a
  - 18         block address; and
  - 19             a snapshot function configured to automatically partition the incremental log into
  - 20         a first and a second volume.
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- 22     13. The interface of claim 9, further comprising a policy assignment function configured
- 23         to assign a policy to an incremental log.
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- 25     14. The interface of claim 9, further comprising a read next entry function configured to
- 26         retrieve a sequential entry from the incremental log.
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1       15. The interface of claim 9, further comprising a compact volume function configured  
2       to compact a snapshot volume.

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4       16. The interface of claim 9, further comprising a delete volume function configured to  
5       release a snapshot volume.

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7       17. A method for managing incremental data storage, the method comprising:  
8              appending data to an incremental log;  
9              automatically partitioning the incremental log in response to a snapshot operation;  
10         and  
11              automatically assigning a volume identifier to a newly formed partition.

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13       18. The method of claim 17, wherein automatically assigning a volume identifier to a  
14       newly formed partition occurs as directed by a storage management policy.

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16       19. The method of claim 17, further comprising conducting in-place compaction of a  
17       snapshot partition.

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19       20. The method of claim 17, further comprising automatically compacting a snapshot  
20       partition.

1       21. An apparatus for managing incremental data storage, the apparatus comprising:  
2           means for appending data to an incremental log;  
3           means for automatically partitioning the incremental log in response to a snapshot  
4       operation;  
5           means for automatically assigning a volume identifier to a newly formed partition;  
6       and  
7           means for conducting in-place compaction of a snapshot partition.

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9       22. A system for redundant incremental data storage, the system comprising:  
10          a primary storage device configured to store data;  
11          a secondary storage device configured to store data within a baseline volume and  
12       an incremental log comprising at least one snapshot partition that corresponds to a  
13       snapshot volume;  
14          a controller configured to store and access data on the primary and secondary  
15       storage device; and  
16          a snapshot management module configured to automatically partition the  
17       incremental log into an additional snapshot partition and associate the additional snapshot  
18       partition with a volume identifier in response to a snapshot operation.

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20       23. The system of claim 22, wherein the snapshot management module is further  
21       configured to automatically compact a snapshot volume into the baseline volume in  
22       response to the snapshot operation.

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24       24. The system of claim 22, wherein the snapshot management module is further  
25       configured to conduct in-place compaction of a snapshot partition.

- 1        25. The system of claim 22, wherein the primary storage device comprises a plurality of  
2        redundantly arranged storage devices.  
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- 4        26. A computer readable image for managing incremental data storage, the computer  
5        readable image comprising program code configured to conduct a process comprising:  
6              append data to an incremental log;  
7              automatically partition the incremental log in response to a snapshot operation;  
8        and  
9              automatically assign a volume identifier to a newly formed partition.  
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- 11        27. The computer readable image of claim 26, wherein the process further comprises  
12        conducting in-place compaction of a snapshot partition.  
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- 14        28. The computer readable image of claim 26, wherein the process further comprises  
15        automatically assigning a volume identifier to a newly formed partition occurs as directed  
16        by a storage management policy.  
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- 18        29. The computer readable image of claim 26, wherein the process further comprises  
19        conducting in-place compaction of a snapshot partition.  
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- 21        30. The computer readable image of claim 26, wherein the process further comprises  
22        automatically compacting a snapshot partition.  
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